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FACT SHEET

NATIONAL EMISSION STANDARDS TO CONTROL HAZARDOUS AIR POLLUTANTS EMITTED FROM PULP AND PAPER MILLS

TODAY'S ACTION

- Today, the U.S. Environmental Protection Agency (EPA) is issuing rules and guidelines to reduce and prevent air and water discharges of toxic pollutants from U.S. pulp and paper mills. Specifically, EPA is:

  1.) Issuing final water standards to control toxic pollutants released from new and existing pulp and paper mills.
  2.) Issuing final air standards to control emissions of toxic air pollutants from pulping and bleaching areas at new and existing pulp and paper mills.
  3.) Proposing air standards to control emissions of toxic air pollutants from the chemical recovery area at new and existing pulp and paper mills

- This fact sheet only describes the air portion of the rule. More information on the water portion of the rule is available on the Internet at the following web address: (http://www.epa.gov/ost/pulppaper/).

- The air standards will reduce toxic air emissions by almost 60 percent from current levels.

- Approximately, 155 mills will be subject to the final air regulations. Of these 155 mills, only 149 will be subject to the proposed air regulations.

- This is the first time, EPA has issued an integrated, multi-media regulation to control the release of pollutants to water and air from one industry. By jointly issuing air and water standards, EPA is enabling the pulp and paper industry to consider all regulatory requirements at one time in selecting the best combination of pollution prevention and control technologies that provide the greatest protection of human health and the environment in the most cost-effective manner.

WHAT ARE THE HEALTH AND ENVIRONMENTAL BENEFITS OF THIS ACTION?

- This regulation will provide important improvements in protecting human health and the environment by reducing toxic pollutant releases to all media. EPA estimates the final and proposed air standards will result in the following annual reductions:

  - a 59 percent reduction in emissions of hazardous air pollutants
  - a 49 percent reduction in emissions of volatile organic compounds

- a 47 percent reduction in emissions of total reduced sulfur
- a 37 percent reduction in emissions of particulate matter
- a 65 percent reduction in emissions of chloroform

- Hazardous air pollutants are also known as air toxics; these are pollutants which are known or suspected to cause cancer or other serious health effects (such as birth defects or reproductive effects).

- Volatile organic compounds play a significant role in the chemical reactions that form ozone. Ozone is not emitted directly into the atmosphere. It is formed when emissions of nitrogen oxides and volatile organic compounds react in the presence of sunlight. While beneficial in the upper atmosphere, ozone in the lower atmosphere can cause a variety of health problems because it damages lung tissue, reduces lung function, and adversely sensitizes the lungs to other irritants.

- Total reduced sulfur are the pollutants that are associated with foul odors from pulp and paper mills.

- Exposure to particulate matter has been linked with adverse health effects, including aggravation of existing respiratory and cardiovascular disease and increased risk of premature death.

- Under the authority of the Clean Air Act, EPA develops emission standards for 188 listed toxic air pollutants. (Note that this list originally contained 189 pollutants, but EPA has subsequently removed the chemical caprolactum from the list.) On July 16, 1992, EPA published a list of industry groups (known as “source categories”) that emit one or more of these air toxics. For listed categories of "major" sources (those that emit 10 tons per year or more of a listed pollutant or 25 tons per year or more of a combination of pollutants), the Clean Air Act requires EPA to develop standards that require the application of stringent air pollution controls, known as maximum achievable control technology (MACT).

BACKGROUND

The Pulp Mill and the Pulping Process

- The pulp and paper industry is one of the nation’s largest industries. EPA estimates that there are approximately 565 manufacturing facilities located in 42 states.

- Wood consists of two primary components, cellulose and lignin. Cellulose, which is the fibrous component of wood, is used to make pulp and paper. Lignin is the “glue” that holds wood fibers together. Pulping is the process which reduces wood to a fibrous mat by separating the cellulose from the lignin.

- Pulping processes are generally classified as chemical, mechanical, or semi-chemical. The three chemical pulping methods are known as kraft, sulfite, and soda. Of these, the kraft and sulfite processes are most common.

- In chemical pulping, wood is cooked in a "digester" at elevated pressure with a solution of the appropriate chemicals which dissolve the lignin and leave behind the cellulose. The cooking process results in emissions of a variety of hazardous air pollutants including formaldehyde, methanol, acetaldehyde, and methyl ethyl ketone.

- In mechanical (or "groundwood") pulping, the wood is pressed against a grinder which physically separates the fibers. Mechanical pulping, which is energy intensive, produces an opaque product which is weak and discolors easily when exposed to light.

- Semi-chemical pulping uses a combination of chemical and mechanical methods. The wood chips are partially cooked with chemicals, and the remainder of the pulping is accomplished mechanically.

- After the wood is pulped, the pulp that is created is washed to remove the dissolved lignin and chemicals. In the washing process, the pulp is passed through a series of washers and screens. The washing process occurs at high temperatures which generates a large volume of exhaust gases containing hazardous air pollutants which are released to the atmosphere.

- The liquid that results from the washing process contains lignin as well as the chemicals used to separate the lignin from the cellulose. The chemical recovery processes used to recover those chemicals for reuse also results in emissions of hazardous air pollutants.

The Paper Mill and the Bleaching Process

- After washing, if a white product is desired, the pulp must be bleached to remove color associated with remaining residual lignin.

- The three general approaches to bleaching are:

  Elemental Chlorine Bleaching is the process currently in place at existing bleaching plants, and uses chlorine (Cl_2) and hypochlorite to brighten the pulp. When elemental chlorine and hypochlorite react with the lignin, they form chlorinated pollutants such as chloroform, dioxins and furans in the wastewater stream.

  Elemental Chlorine Free Bleaching (ECF) replaces chlorine with chlorine dioxide as a bleaching agent and hypochlorite in no longer used. The use of ECF bleaching results in reduced levels of chlorinated pollutants in the air and water waste streams.

Totally Chlorine Free (TCF) bleaching uses no chlorinated bleaching agents to bleach the pulp. Instead, bleaching agents such as oxygen and peroxide are used. TCF bleaching eliminates chlorinated pollutants in the air and water waste streams.

- Typically, in the bleaching process, the bleaching chemicals are injected into the pulp, and the resulting mixture is washed with water. This process occurs several times and generates a large volume of liquid waste. Additionally, vents from the bleaching tanks emit hazardous air pollutants including chloroform, methanol, formaldehyde, and methyl ethyl ketone.

- Depending on the bleaching chemicals used, the waste stream from the bleaching process may contain chlorine compounds and organics. The mixture of chemicals may result in the formation of a number of toxic chemicals (such as dioxins, furans, and chlorinated organics). Although this effluent is generally released to a waste water treatment plant, the chemicals named above simply "pass through" (i.e. the treatment plant does not reduce the concentrations of these pollutants) the plant and accumulate in the rivers and oceans to which the treatment plant discharges.

- It is important to note that not all pulp mills are combined with paper mills. Some mills just produce pulp and sell this product to producers of paper. Because it is the bleaching process that creates a waste water discharge stream some pulp mills (approximately 59) are only affected by the air standards that EPA is issuing today for this industry.

WHAT AIR STANDARDS IS EPA ISSUING TODAY FOR THE PULP AND PAPER MILL INDUSTRY?

- The air standards of this action, will affect 155 mills in the U.S. that produce pulp by chemically processing virgin wood as the fiber source.

- In this action, EPA is requiring that pulp and paper mills capture and control emissions of toxic air pollutants that occur throughout the paper making process. These emissions occur at the vents during the cooking, washing, and bleaching processes.

- Additionally, EPA is proposing that 149 of the 155 pulp mills control emissions that occur during the chemical recovery process (see "the pulp mill and the pulping process" in the background section). After the pulp is cooked and washed, the resulting waste stream containing the dissolved lignin and cooking chemicals is processed to recover the chemicals. Even though the recovery process varies, depending on the pulping method, most mills have some mechanism to burn the waste stream. In the process of recovering the pulping chemicals, toxic air pollutants in the form of particulate metals and organic gases are emitted to the atmosphere. In this action EPA is proposing limits on the emissions of these pollutants.

- It is important to note that many of the toxic air pollutants emitted from the pulp and paper source category are also volatile organic compounds. These substances are precursors to ozone, or smog, formation. The control technologies that industry uses to comply with standards for toxic air pollutants has the additional benefit of significantly reducing emissions of volatile organic compounds and in turn ozone.

WHAT WILL BE THE COST OF THE AIR PORTION OF THE RULE?

- EPA estimates that the air portion of the rule will cost $105 million in post tax annualized expenditures and $760 million in capital expenditures.

HOW DOES THE RULE PROVIDE FLEXIBILITY TO INDUSTRY AND PROMOTE POLLUTION PREVENTION?

- Although EPA based it's effluent limitations and air toxics emission standards on specific technologies, mills may choose their own control technologies and process change combinations to meet these regulations.

- The controls to reduce the amount of chloroform emitted to the air are the same controls required to reduce the amount of dioxins, furans, and chlorinated phenolics released to the water. Therefore, mills can install one type of pollution control technology and reduce releases of toxic pollutants to both air and water.

- The air standards provide a compliance extension of up to 8 years from promulgation for high volume vents at Kraft pulping processes. This extension is designed to encourage mills to install pollution prevention technology that will reduce toxic air pollutant emissions from the pulping process as well as both air and water pollutant discharges from the bleaching process.

- As part of the integrated rulemaking, the required air controls, which reduce the amount of pollutants available to evaporate from certain waste streams generated by the mill, also reduce the concentration of pollutants in the mill's effluent. As the concentrations of pollutants in the mill's effluent decrease, and since the effluent is often sent to a waste water treatment plant to further remove pollutants, the air controls will effectively reduce the pressures imposed on the wastewater treatment plant.

FOR FURTHER INFORMATION

- Interested parties can download the rule from EPA's web site on the Internet under recently signed rules at the following address: (http://www.epa.gov/ttn/oarpg/rules.html). For further information about the final air rules, contact Ms. Penny Lassiter of EPA's Office of Air Quality Planning and Standards at (919) 541-5396, or Mr. Stephen Shedd at (919) 541-5397. For further information about the proposed air rules, contact Mr. Jeffrey

Telander of EPA's Office of Air Quality Planning and Standards at (919) 541-5427.

- EPA's Office of Air and Radiation’s homepage on the Internet contains a wide range of information on the air toxics program, as well as many other air pollution programs and issues. The Office of Air and Radiation's homepage address is: (http://www.epa.gov/oar/).